

Remarks and Arguments

Claims 28-51 were pending for examination. Claims 28, 30, 40, 42-47 and 51 have been amended. New claims 52-69 have been added.

The claims remaining for examination are claims 28-70.

Section 112 – Claim Rejection

Applicant has amended the claims to remove the objected to “preferably” clauses and has added new dependent claims to cover this subject matter. Such amendments are believed to overcome the rejection.

Section 103 - Prior Art Rejections

Claims 28-34 and 42-51 were rejected under Section 103 as obvious over Copf DE 19949890.

Claims 35-41 were rejected under Section 103 over Copf in view of Atkinson US Patent 6,551,958.

Applicant respectively asserts that the present claims patently distinguish over the prior art of record for the reasons set forth below.

State of the art

Copf DE 199 49 890 discloses an implant for an ankle joint made of titanium. The surface is partly machined, sandblasted and etched resulting in a rough surface. The possible coating of the implant surface with bone morphogenetic protein 7 (BMP-7) is mentioned in a general way.

Atkinson et al. US 6,511,958 discloses a cartilage repair product that induces cell ingrowth into a bioresorbable material and cell differentiation into cartilage tissue.

The present invention

The claimed invention is a osteogenic implant made of titanium metal and having a surface which is at least partly covered with a polypeptide at a rate of 5 to 70% based on the maximum coverage of the metal surface with a monomolecular layer of said polypeptide.

Novelty

Novelty of the subject-matter of the independent claims 28, 47 and 51 is acknowledged. The same applies for the dependent claims.

Non-obviousness

Copf DE 199 49 890 appears to represent the closest state of the art as it relates to the same technical field, namely implants. Copf describes ankle joint implants made of titanium and partly having a rough surface. The coating of the implant surface with bone morphogenetic protein 7 (BMP-7) is mentioned in a general way. It does not disclose how the coating is achieved, let alone how a partial monomolecular layer (monolayer) can be obtained.

The problem of the present invention is to provide an implant having a surface with excellent osteointegration properties in terms of strength and speed.

The problem is solved with an implant according to claim 28 of the present invention and a method according to claim 47 for producing said implants and a method for using said implants as a dental implant according to claim 51.

An implant according to the present invention is manufactured for instance by machining or sandblasting, followed by subsequent etching of the implant. After such treatment there are sites on the surface of the implant which may be termed "active"

binding sites (hydroxyl groups). Subsequently, the implant is treated with the desired polypeptide whereby the "active" binding sites allow the formation of a regular and oriented polypeptide monolayer. Without the "active" binding sites the treatment of an implant with a polypeptide would result in a general deposition of polypeptide in an irregular manner and not in the form of a monolayer.

Implants according to the present invention are at least partially coated, meaning that there is a coverage of a minimum of 5% to a maximum of 70% based on the maximum coverage. The coating comprises polypeptides forming a monolayer and binding directly on the metal surface. According to the present invention it is crucial that the coverage is not complete but only partial. The preferred range of 8% to 20% shows that a quite low percentage of coverage based on the maximum possible achieves the best results. The partial coverage is also important with respect to the direct contact of bone growth promoting cells (osteoblasts) with the implant surface. The "active" binding sites not involved in forming the polypeptide monolayer provide attachment sites for these cells, thereby accelerating the formation of a stable implant/bone tissue interface.

In contrast, Copf mentions the coating of an implant with proteins only in a general, speculative way. One skilled in the art does not get any teaching how to obtain a (partial) coating. If he considered a coating at all, he would favour a maximum coverage, since increasing amounts of BMP-7 would prompt him to expect increased bone growth.

Atkinson et al. US 6,511,958; Atkinson et al. discloses various compositions promoting cartilage growth. Implants comprising a collagen matrix and a cartilage growth promoting composition are also described. What kind of teaching does one skilled in the art expect to find in D2 when he is looking for solutions to improve osteointegration of a titanium implant? None! Bone and cartilage are completely different tissues and compositions promoting cartilage growth cannot be expected to promote the growth of bone tissue.

Even if one skilled in the art tried to combine Copf and Atkinson et al. he would not achieve an implant according to the present invention. He would rather end up with an implant having a surface that promotes cartilage growth. The combination therefore teaches him away – in a direction contrary to the solution he is looking for.

The references cited above do not render obvious, either alone or in combination, the subject-matter as defined in the claims of the present invention. Thus, the subject-matter of the independent claims 28, 47 and 51 is inventive over Copf and Atkinson et al. The same applies also for the dependent claims.

RECONSIDERATION

It is believed that all claims of the present application are now in condition for allowance.

Reconsideration of this application is respectfully requested. If the Examiner believes that a teleconference would expedite prosecution of the present application the Examiner is invited to call the Applicant's undersigned attorney at the Examiner's earliest convenience.

Any amendments or cancellation or submissions with respect to the claims herein is made without prejudice and is not an admission that said canceled or amended or otherwise affected subject matter is not patentable. Applicant reserves the right to pursue canceled or amended subject matter in one or more continuation, divisional or continuation-in-part applications.

To the extent that Applicant has not addressed one or more assertions of the Examiner because the foregoing response is sufficient, this is not an admission by Applicant as to the accuracy of such assertions.

Please grant any extensions of time required to enter this response and charge any fees in addition to fees submitted herewith that may be required to enter/allow this response and any accompanying papers to our deposit account 02-3038 and credit any overpayments thereto.

Respectfully submitted

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